Biotreatment of air containing triethylamine (TEA) vapor in biotrickling filter

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Abstract

Background: Treatment of waste air containing volatile organic compounds (VOCs) using cheap and environmentally friendly methods is one of active fields in air pollution control.

Objective: The aim of this study was to treat air containing triethylamine (TEA) vapor using biotrickling filter inoculated with microbial species decomposing TEA.

Methods: This experimental study was conducted in the School of Health affiliated to Qazvin University of Medical Sciences in 2014. Biotreatment was performed with biotrickling filter inoculated with microbial species decomposing TEA for two months. The biotrickling filter was set up with air containing TEA as the sole source of carbon, at Empty Bed Residence Times (EBRT) of 36 sec, and inlet concentration of 84 ppm. Data were analyzed using descriptive statistics.

Findings: Treatment of TEA contaminated air was made after an adaptation period of 11 days. Despite an increase in mass loading to 111 $g/m^3/h$, TEA was eliminated with 109 $g/m^3/h$ capacity and 94-100% removal efficiency by zero order kinetics.Elimination capacity and removal efficiency were close to each other and confirmed109 g/m3/h as loading region with critical elimination capacity.

Conclusion: With regards to the results, it is possible to treat air containing TEA vapor in biotrickling filter.

Keywords: Air pollution, Biotreatment, Biotrickling filter, Triethylamine

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